robust damping controller for SMES using loop-shaping technique

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Abstract

A robust damping controller for a power system installed with super-conducting magnetic energy storage (SMES) has been designed using a simple graphical loop-shaping technique. The graphical method starts by selection of a nominal plant function satisfying the robust stability and performance criterion. The variations in operating conditions from the nominal values are modeled as multiplicative structured uncertainty. The generator-SMES system has been represented with a detailed dynamic model for the control design. The robust design, with generator speed variation as the controller input, was tested for a range of operating points considering various disturbances. It is observed that the fixed parameter robust controller provides very good damping for a wide range of operating conditions.